

In accordance with Federal statutes and regulations and NSF policies, no person on grounds of race, color, age, sex, national origin, or physical handicap shall be excluded from participation in, denied the benefits of, or be subject to discrimination under any program or activity receiving financial assistance from the National Science Foundation.

1982 CATALOG OF FEDERAL DOMESTIC ASSISTANCE

The National Science Foundation program described in this publication falls under the following category in the latest Catalog of Federal Domestic Assistance.

47.048—Science Education Research and Development and Resources Improvement

NATIONAL SCIENCE FOUNDATION
Development in Science Education
Area of Emphasis: Technology in Science Education

Purpose: During Fiscal Year 1982 the Development in Science Education (DISE) program will support only one of its areas of emphasis: Technology in Science Education. In this last year of the DISE program, projects are encouraged which address *national* concerns for improving science and engineering education. This NSF activity will encourage industry-academe collaboration in these project activities, with NSF support for prototype computer-related development activities to be matched by the proposing institutions and by gifts of computers and related equipment from industry.

Proposals are encouraged for the development of creative, innovative prototypes of computer-based instructional materials or model programs that have strong potential for generating ideas for making significant improvements in the nation's science and engineering education efforts. These proposals should:

- explore the uses of computing in traditional science or engineering courses, radically restructured traditional topics, or in completely new content areas. An endless variety of applications is possible; for example,
 - 1) bringing research techniques and tools into the class and instructional laboratory;
 - 2) simulating expensive or dangerous laboratory experiments;
 - 3) improving laboratory procedures such as data collection and analysis;
 - 4) updating or advancing the computer science and engineering knowledge of faculty who teach science and engineering.
- have the potential for making major advances in science instruction by anticipating the requirements for science or engineering education in the late 1980's and the 1990's and the capabilities of future generations of information technology.
- incorporate our best current knowledge of new or recently significant science or technology.

Since the DISE program encourages proposals which address national concerns in the improvement of science and engineering education, proposals should document the national needs addressed and describe the methods for ac-

chieving national dissemination of findings; for example, through the scientific and popular literature and professional meetings.

Eligible Levels and Topics: Only those projects that deal with instructional uses of computing in science at the level of grades 10-12 and in science or engineering for the first two undergraduate years are eligible. The audience for these materials may span diverse age ranges. The materials may be developed for the school or post-secondary institution, the home or other out-of-school settings. The science and engineering content of the proposal may encompass topics from traditional courses, a novel restructuring of traditional topics, or completely new subject areas.

Mathematics is eligible within the context of the topics of science or engineering. The Foundation has recently made considerable investments in the use of computers in the teaching of mathematics. This new activity is intended to emphasize the use of computers in science and engineering and in the applications of mathematics, and thus to complement these earlier activities.

Eligible Proposers: Proposals are invited from U.S. academic organizations (including 2-year colleges, 4-year colleges, universities, and consortia) or non-academic profit or non-profit organizations or combinations thereof. *Schools or school districts may participate in projects by associating with one of the above groups.* The Foundation strongly encourages women and minorities to compete fully in all of its programs. **Closing Date:** July 6, 1982, 5:00 p.m., Eastern Daylight Time.

Intent-to-Submit Card: To facilitate our preparations for the review process, please complete and submit the Intent-to-Submit Card (back cover of this brochure) as soon as you have decided to submit a formal proposal.

PROPOSAL FORMAT

Formal proposals should contain the following elements, presented in the order indicated:

- Cover Page (Duration: up to 36 months; Start date: not before October 1, 1982)
- Project Summary (NSF Form 4)
- Total Project Costs (see page 5 of this brochure.)
- Budget Explanation
- Summary Proposal Budget (NSF Form 1030)
- Narrative
- Other Commitments of Senior Personnel
- Appendices

NSF standard forms are used unless otherwise indicated. These, and other pertinent information, are contained in the publication, *Grants for Scientific and Engineering Research*, NSF 81-79, which may be obtained from the NSF Office of Forms and Publications, National Science Foundation, 1800 G Street, N.W., Washington, D.C. 20550.

Total Project Costs

The total cost of the project is to be borne in up to three ways: an NSF contribution (which may not be applied to equipment purchased); an industrial contribution—permanent equipment, if needed, (from the participating donor list or from the proposer's donor); and an organizational contribution.

The Total Project Costs budget form, with its three columns for each of the contributors above, is used for these proposed budgets.

Donated Equipment: NSF will provide no funds to purchase equipment in any project supported in this program. Proposers have the following options regarding equipment:

- Proposers may use their own equipment;
- Proposers may solicit their own donations of equipment.
- Proposers may request equipment from the list of participating donors described, in detail, below.

Proposer's Donor: The proposer may seek donations of equipment on his own. A letter from the donating company certifying the donation should be included as an appendix. In terms of the proposal budget, the value of the donation is the retail cost of the equipment.

Participating Donors: The companies participating in this cooperative effort are listed in a flyer, NSF 82-20B, which will be mailed on May 17, 1982. If you have received these guidelines through an NSF mailing, NSF will also mail the flyer to you. Otherwise, to request the flyer, send two self-addressed gummed labels to the:

Development in Science Education
Attention: Participating Donor Flyer
National Science Foundation
Washington, D.C. 20550

Equipment that is available for this program from the donor companies is indicated in the flyer. Requested equipment and its retail cost should be specified in the proposal and budget just as if it were to be purchased commercially. The number of systems that may be requested in one proposal is open, but each item requested must be fully justified. Two configurations of equipment, each from different vendors should be specified and ranked as to preference. The alternate configurations are to be used by the program to recommend awards of equipment as inventories are depleted.

Cost Sharing: The combination of NSF funds plus retail value of donated equipment may account for no more than 3/4 of the total project costs. Thus, in all cases, the institution is expected to contribute at least 1/4 of the total costs. The following table summarizes eligible budget items and proportional contributions:

NSF (faculty and staff salaries, travel, indirect costs, software, etc., but no equipment)	} Not to exceed 3/4 of the total budget
Donated equipment	
Proposer contribution (faculty and staff salaries, travel, indirect costs, etc., new equipment purchased by the proposer)	At least 1/4 of total budget

Projects with total budgets higher than \$75,000 may be proposed but must have strong justification.

Travel: Sufficient travel funds should be included in the proposal budget to allow the Principal Investigator to attend two meetings to foster the sharing of creative ideas and to increase the rate at which information about promising approaches is disseminated. Two series of meetings will be held with grantees of this program and other invited participants. Both series will be regional meetings in San Francisco, Chicago, and Washington, D.C. The first series is tentatively scheduled for mid to late 1983, the second series for mid-1984. Proposal budgets should include funds for two trips to the location nearest the grantee institution.

Budget Explanation:

In a separate "Budget Explanation" section, components of each major item in the budget should be identified and justified. The explanation should briefly state why an item is important and the basis on which the projected cost was estimated. Reviewers must be able to relate each budget item clearly and specifically to the activity it supports. The narrative page reference on the budget form is to facilitate this process.

Summary Proposal Budget:

NSF form 1030 will be used, in the event an award is made, to prepare the official budget for the project. Under the column headed "Funds Requested by Proposer," list only the NSF contribution to project costs. This column should correspond to the "NSF" column of the Total Project Costs budget. The second column entitled "Funds Granted by NSF" is for Foundation use only.

Narrative:

The narrative must not exceed 15 double-spaced pages. Whenever possible concise wording, graphical presentation and other techniques that would shorten the proposal should be employed. The narrative should:

- Identify the national concerns for science or engineering education to be addressed.
- Include a clear description of the science or engineering content and instruction, and specify how it is to be developed, changed, or improved by the use of information technology. Examples should be given and formative evaluation procedures described. A mile-

stone chart showing the schedule of activities should be included.

- Describe the potential outcomes and results of the proposed activity and plans for dissemination.
- Match the backgrounds of the staff to the goals of the project and describe the institutional resources and contribution to the project. Vitae of all principals should be included in the appendix.

Other Commitments of Senior Personnel:

All current support for each investigator, including title, source and amount per year or for the grant period must be supplied. (See Appendix IV of *Grants for Scientific and Engineering Research*.)

Appendices:

Appendices should include vitae of principal personnel. In addition, they may be used sparingly to provide background supporting information. The "Facilities" section described in *Grants for Scientific and Engineering Research* is *not* required.

PROPOSAL EVALUATION

Method of Selection:

Proposals will be reviewed by the staff of the National Science Foundation assisted by persons in the appropriate science, engineering, and education communities, in professional groups, and in relevant Federal agencies. When appropriate, individuals representing the public may be included as reviewers. Proposals will be selected for award which, in the judgment of the staff, offer the greatest potential for improving science and engineering education. Negotiations will be carried out in many cases. In cases of substantially equal merit, consideration may be given also to such factors as program balance, and a project's impact on special concerns (for example, participation of women and minorities in science, utilization of interdisciplinary approaches in appropriate areas, distribution of resources with respect to institutions and geographical areas, etc.).

Evaluation Criteria:

Formal proposals are evaluated according to the quality, merit and significance of the projected results and of the design of activities to achieve those results. Reviewers will examine proposals and submit comments based on the following criteria:

Quality and Rationale. Has the proposal identified an important national need, problem or opportunity in science or engineering education—is this a good idea? Do the conceptualization of the problem or opportunity and the proposed solution show imagination and creativity? Are the project objectives clear and relevant to the purpose of the program?

Project Design and Evaluation. Does the proposal articulate a well-formulated plan of attack on the problem identified? Is the equipment proposed appropriate for the task? Are there good procedures for formative evaluation?

Potential for Improvement of Science or Engineering Education. Would successful outcomes and results of this proposed activity generate ideas for making a significant difference in science or engineering education? Are there good plans for national dissemination of findings?

Personnel and Institutional Resources. Are the staff members and institutional resources of high quality? Are there any serious personnel gaps unrecognized or unfilled? Is the institution committed to the project.

Budget. Are the costs of the project—salaries, services, and other expenses—reasonable? Does the budget reflect a realistic assessment of the magnitude of the task?

SUBMISSION OF PROPOSALS

1. Ten (10) copies of the complete proposal are required.
2. Two (2) extra copies of the Cover Page and the Project Summary are required.
3. Copy must be typed double-spaced on one side only of 8½" x 11" paper. The Narrative section should not exceed 15 double-spaced pages.
4. Pages are to be numbered at the bottom.
5. Proposal copies are to be assembled in the order shown above, and stapled in the upper left hand corner, but not otherwise bound.
6. The original signed Cover Page is the only letter of transmittal needed or desired. Institutional letters of endorsement or transmittal, supporting letters, institutional forms, etc., if included, must be appended to the back of the proposal.
7. Proposals must be securely bound in a single package and either mailed to:

Central Processing Section
National Science Foundation

Washington, D.C. 20550

Attn: Development in Science Education
or hand-delivered to
Room 223, NSF,

1800 G Street, N.W., Washington, D.C.

Closing date: The proposals must be at *NSF* by 5:00 p.m.,
July 6, 1982.

8. To facilitate prompt acknowledgment of the arrival of the package at the Foundation, the proposer should attach to the signature copy of the cover page two postcards for acknowledgement of receipt. Address one card to the Principal Investigator and the other to the official authorized to sign the Cover Page. When the package arrives, the date of receipt and an assigned proposal number will be stamped on the card before it is returned, so that thereafter the proposer and the Foundation may refer to this proposal number in correspondence. If receipt is not acknowledged within 2 weeks of submission, the program office should be contacted promptly at 202/282-7910.

OTHER CONSIDERATIONS

Inventions: Any invention conceived or first actually reduced to practice during NSF-supported research must be disclosed to the Foundation's Office of the General Counsel. Small business firms and nonprofit organizations have the right to retain the principal patent rights to such inventions. Other grantees may ask the Foundation to permit them to retain principal patent rights after disclosing an invention. Formal proposals should disclose any pre-existing inventions or patents. Further information may be obtained from the Foundation's Office of the General Counsel.

Software: Rights to computer software developed during the course of the project will be determined at the time of award, and terms designed to protect the public interest and the equities of the parties will be negotiated with prospective awardees. Such terms will reserve certain rights for the Government to use the resulting software and will designate the extent to which other users may have access to the software as well as the rights that the grantee may acquire. NSF is particularly interested in assuring that resulting software will be available to educational institutions for re-

search and educational purposes. Formal proposals should describe any pre-existing software.

Copyrights: The grantee may claim copyright in any material produced with NSF support. The Foundation reserves a license for Governmental purposes.

Publications: The grantee must include an Acknowledgment of Support and Disclaimer in every publication of material produced with NSF support. The grantee must obtain the approval of the Grants Officer before any commercial publication or distribution of material is produced under this grant. For further information, see NSF Circular #123, "Implementing Publication/Distribution Agreements Relating to NSF Supported Curriculum Materials," which may be obtained by writing Forms and Publications, National Science Foundation, Washington, D.C. 20550.

Title to Equipment: Equipment title will pass directly from the donor to the grantee institution. Equipment will be provided with the understanding that (1) it will remain in use for the specific project for which it was given; (2) it will be subject to appropriate maintenance procedures; and (3) it will be subject to institutional inventory controls.

TOTAL PROJECT COSTS

ORGANIZATION							
NARRATIVE PAGE REFERENCE							
A. SENIOR PERSONNEL: PI/PD, Co-PI's, Faculty and Other Senior Associates (List each separately with title; A.6. show number in brackets)	NSF FUNDED PERSON-MOS.			NSF	INDUSTRY	ORGANIZATION	TOTAL
	CAL.	ACADE	SUMP				
1.				\$			
2.							
3.							
4.							
5. () OTHERS (LIST INDIVIDUALLY ON BUDGET EXPLANATION PG.)							
6. () TOTAL SENIOR PERSONNEL (1-5)							
B. OTHER PERSONNEL (SHOW NUMBERS IN BRACKETS)							
1. () POST DOCTORAL ASSOCIATES							
2. () OTHER PROFESSIONALS (TECHNICIAN, PROGRAMMER, ETC.)							
3. () GRADUATE STUDENTS							
4. () UNDERGRADUATE STUDENTS							
5. () SECRETARIAL-CLERICAL							
6. () OTHER							
TOTAL SALARIES AND WAGES (A+B)							
C. FRINGE BENEFITS (IF CHARGED AS DIRECT COSTS)							
TOTAL SALARIES, WAGES AND FRINGE BENEFITS (A+B+C)							
D. PERMANENT EQUIPMENT (LIST ITEM AND DOLLAR AMOUNT FOR EACH ITEM EXCEEDING \$1,000; ITEMS OVER \$10,000 REQUIRE CERTIFICATION)							
TOTAL PERMANENT EQUIPMENT							
E. TRAVEL 1. DOMESTIC (INCL. CANADA AND U.S. POSSESSIONS)							
2. FOREIGN							
F. PARTICIPANT SUPPORT COSTS							
1. STIPENDS \$							
2. TRAVEL							
3. SUBSISTENCE							
4. OTHER							
TOTAL PARTICIPANT COSTS							
G. OTHER DIRECT COSTS							
1. MATERIALS AND SUPPLIES							
2. PUBLICATION COSTS/PAGE CHARGES							
3. CONSULTANT SERVICES							
4. COMPUTER (ADPE) SERVICES							
5. SUBCONTRACTS							
6. OTHER							
TOTAL OTHER DIRECT COSTS							
H. TOTAL DIRECT COSTS (A THROUGH G)							
I. INDIRECT COSTS (SPECIFY)							
TOTAL INDIRECT COSTS							
J. TOTAL DIRECT AND INDIRECT COSTS (H + I)							
K. RESIDUAL FUNDS							
L. AMOUNT OF THIS REQUEST (J) OR (J MINUS K)							
				\$	\$	\$	\$

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NATIONAL SCIENCE FOUNDATION
WASHINGTON, D.C. 20550



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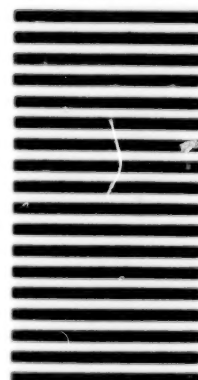
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Principal Investigator: _____

Submitting Institution: _____

NSF 82-20A